

## ON THE ANATOMY OF AEROPE AND ZINGIS.

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I am indebted to Mr. John Ponsonby of London, for alcoholic specimens of a number of South African land-mollusks from which the following anatomical notes are drawn.

**AEROPE** Albers.

The genus *Aerope* was founded on purely conchological characters by Albers and classed with the Helices, between *Microphysa* and *Pella*.<sup>1</sup>

Mörch, in 1865, having dissected a specimen of the type and only species of the genus, *H. caffra* Fér., placed it in the *Agnatha*,<sup>2</sup> commenting upon the enormous size of the radula, with subulate, elongated teeth disposed in converging lines. From an examination of the animal of *Helix knysnaënsis* of Pfeiffer, I am strongly inclined to refer it to *Aerope*. My specimens having been in strong spirit are much contracted, so that the following description is necessarily imperfect.

***Aerope knysnaënsis*** Pfr. (Pl. ix, figs. A, B, C, D).

The shell is thin but strong, somewhat translucent, yellow, more or less deeply tinged with green. Its surface is very bright and polished, rather coarsely obliquely irregularly striate. There is considerable variation in the contour of these shells, my figure D representing an extremely elevated form.<sup>3</sup>

The foot (Pl. ix, figure J) is rather short, truncated anteriorly and a trifle produced at the antero-lateral angles. The sole is (in my contracted specimens) transversely wrinkled, and although there is no division into longitudinal tracts, the central part is lighter colored. There are no furrows above the lateral margins, nor is there a posterior mucous pore. The upper surface is coarsely granular.

The buccal mass (Pl. ix, fig. J, b.) is almost as long as the foot; longer than in any genus with which I am acquainted. The radula is correspondingly elongated. The formula of teeth is about 27-1-

<sup>1</sup> Die Heliceen, 2d edition, p. 83. Type, *H. caffra* Fér.

<sup>2</sup> Journal de Conchyliologie, 1865, p. 395. Mörch says: "J'ai eu occasion d'examiner un animal desséché, dans lequel j'ai pu constater le présence d'un appareil lingual relativement colossal, pourvu de dents subulées très-longues, et disposées en lignes convergentes."

<sup>3</sup> See Pfeiffer's description, Monographia, i, p. 84. The figures in the 'Conchylien Cabinet' are very unsatisfactory.

27. The rhachidian tooth (fig. E, *r*) is small, narrow, subulate, with well-developed cusp. Its base differs in form from the corresponding part in *Streptaxida*, *Oleacinida*, or *Selenitida*, being produced into two slender diverging branches. The lateral teeth are all of purely 'aculeate' form, and increase in size from the first to the twelfth, which is enormously developed. The teeth lying outside of the twelfth are apparently functionless; they are minute, and decrease in size rapidly toward the outer edge of the radula. All of the teeth have distinct basal-plates. The cusps seem simply sabre-shaped when lying in a natural position; in figure E, I have drawn the third, fourth and fifth teeth seen partly in profile. The affinities of the genus seem to be with *Rhytida*, judging from the characters of the radula, differing from that genus in the retention of a well-developed rhachidian tooth.\* A complete half-row of teeth is shown in figure E.

The genitalia (Pl. ix, fig. G) present no characters unusual in the *Agnatha*, bearing a closer resemblance to those of *Glandina* than to any other form known to me. Like *Glandina* the penis is rather slender, the vas deferens inserted at its apex, and forming a continuation of the former organ. The ovotestis is formed of a compact mass of club-shaped coeae about thirty-five in number. The hermaphrodite duct is considerably convoluted and short between the ovotestis and the albumen gland. Its lower portion ("vagina") is convoluted or twisted several times upon itself. The duct of the spermatheca (again as in *Glandina*) is very long, inserted high upon the oviduct, and terminates in a small oval receptaculum seminis. The genital orifice is very near the head.

#### ZINGIS, von Martens.

*Zingis* was proposed for a South African Nanioid species with the following characters: "shell heliciform with simple peristome; hinder extremity of the foot with mucous pore and a little prominence above it; jaw smooth, with median projection; marginal teeth of the radula bicuspidate." Type, *Z. radiolata* Mart., from near

\* See Hutton, Trans. New Zealand Institute, xvi, p. 167, pl. 10, figs. s, R, Q. for dentition of *Rhytida*. Also Binney, Annals N. Y. Acad. Sciences iii, p. 82, pl. xvii, fig. L.

In the form of the central tooth, *Aerope knysnaensis* seems to be nearest to certain species of *Glandina*. See Fischer et Crosse, Moll. Mex. et l'Amer. Cent., pl. 4, fig. 10 (*G. algira*). Other species of *Glandina* have simply a narrow basal plate, without cusp. From all *Streptaxida*, *Aerope* differs in possessing distinct basal plates to all of the teeth.

Zanzibar. I find that a number of species referred by authors to Albers' group *Pella* belong to *Zingis* or its immediate neighborhood. *Pella* of Albers, Pfeiffer, Tryon and others, is a heterogeneous group, composed of widely dissimilar elements. It cannot be properly characterized until the anatomy of *H. bisculpta* Benson, its type, is known. Of its other species, *H. rariplicata* Bens.<sup>2</sup> belongs to true *Helix*; *H. vernicosa* Krauss, seems to be a *Rhytida*; *H. kuysnaënsis* Pfr. belongs to *Aerope*; *H. natalensis* Pfr. and a number of other species to *Zingis*.

It is likely that *Zingis* will be found to contain a number of African species usually referred to *Vitrina*, such as *V. pöppigi* Mke., *cornea* Pfr., *natalensis* Pfr., *rüppeliana* Pfr., *transvaalensis* Craven; as well as a portion of the forms included by authors in *Pella*.

**Ariophanta** (*Zingis*) *natalensis* Pfr. (Pl. ix, figs. II, I.)

The shells of my specimens correspond with Pfeiffer's figures and description.<sup>4</sup> The shell is so fragile that I found it almost impossible to remove the animal (hardened in spirit) without breaking it. The foot (pl. ix, fig. I) is rather narrow and long, the sole indistinctly longitudinally tripartite. Above its lateral margins are well-defined longitudinal furrows. The mucous pore is subtriangular, and there is a short horn above it.

The radula (pl. ix, fig. II) has teeth of similar form to those figured by von Martens for *Zingis radiolata*, so far as I can judge from his figures, which do not show the form of the basal plates of the marginal teeth. The rhachidian plate has three cusps with strongly reflected cutting-points. The lateral teeth are similar except that the inner cusp is suppressed. They number nine on each side. The transition to marginals is formed by the elevation of the outer cusp upon the side of the principal one, as is usual throughout *Ariophanta* ('*Nanina*'). The marginal teeth are very numerous, close-set, and are all of the form shown in figure II, even to the tiny outermost ones.

<sup>1</sup> Monatsb. K. p. Akad. Wissenschaften zu Berlin, 1878, p. 290; and Zool. Record, 1878, Moll, p. 63.

<sup>2</sup> Binney, Ann. N. Y. Acad. Sci., iii, p. 89.

<sup>3</sup> Binney, l. c. p. 82.

<sup>4</sup> Monographia Heliceorum, i, p. 29; Conchylien Cabinet, *Helix*, pl. 29, figs. 30-32.